

26 September 2005

To: Paul Philp
DOE Project Manager, Run IIb CDF Detector Project

From: Pat Lukens
Project Manager for the Run IIb CDF Detector Project

Subject: Run IIb CDF Detector Project August 2005 Report

Attached is the monthly report summarizing the August 2005 activities and progress for the Fermilab RunIIb CDF Detector Project. This report is available electronically at:

<http://www-cdf.fnal.gov/run2b.html>

cc: A. Annovi
J. Appel
E. Arroyo
D. Benjamin
J. Butler
H. Frisch
D. Hoffer
J. Huston
R. Hughes
E. James
YK Kim
D. Knapp
B. Knuteson
S. Kuhlmann
T. Liu
M. Lindgren
J. Livengood
R. Lipton
P. Lukens
T. Miao
H. Montgomery
V. O'Dell
P. Oddone
V. Pavlicek
K. Pitts
R. Roser
TJ Sarlina
T. Shaw
M. Shochet
K. Stanfield
J. Strait
E. Temple
D. Toback
C. Trimby
V. White
P. Wilson
B. Winer

RunIIb CDF Detector Project
Progress Report No. 33
1 - 31 August 2005

I. PROJECT DESCRIPTION

The primary goal of the CDF Run IIb Detector Project is to enable the detector to exploit the physics opportunities available during Tevatron operation through 2008. The data from Run II will represent a set of detailed measurements that can be compared with the predictions of the Standard Model at the highest available collision energy. The increased size of the data sample will allow us to study the top quark by measuring the details of its production and decay mechanism. In addition, we plan precision electroweak and QCD measurements, continued searches for a variety of phenomena that are predicted to exist beyond the Standard Model framework, and to explore CP violation in the b quark sector. The detailed physics goals of the upgrade are described in the Technical Design Report (TDR).

The major tasks of this upgrade are:

- Upgrade the calorimeter by replacing the Central Preradiator Chamber with a device with shorter response time to allow operation in a high-luminosity environment, and adding timing information to the electromagnetic calorimeters.
- Upgrade the data acquisition and trigger systems to increase throughput needed for higher luminosity operation and efficiently trigger on the higher multiplicity events of Run IIb.

II. OVERVIEW OF PROJECT STATUS – Pat Lukens

The project continues to move towards completion. The remaining subprojects are entering their commissioning phases. The Silicon Vertex Trigger project continues to make use of beam time for tests. The track fitter TF ++ boards, are being used in end of store tests; this has only minimal effect on operations. The Event builder is now part of the DAQ system.

The project is currently 84% complete, based on costs, and is on track for completion before the end of 2005.

III. PROJECT MILESTONE SUMMARY (as of 31 August 2005)

CDF Data Acquisition & Trigger (L1 and L2) Milestones Sorted by Baseline Completion Date

WBS	Title	Baseline Comp. Date	Forecast/Actual Completion Date	Complete
1.3.2.6.3	Begin production of Level 2 Pulsar system	12 Nov 03	12 Nov 03	Yes
1.3.1.6.6	First Prototype TDC available for testing	19-Nov-03	16-Feb-04	Yes
1.3.4.4.1.4	Prototype Event Builder hardware arrives	3-Jun-04	31 Mar 04	Yes
1.3.2.10	Pulsar Hardware Ready for Installation	31-Aug-04	20-Aug-04	Yes
1.3.6.1.1.7	Begin AMS Design Work	1-Sept-04	2-Aug-04	Yes
1.3.6.1.3.7	Begin Track Fitter Design	1-Sept-04	2-Aug-04	Yes
1.3.4.5.3	Production Readiness Review - Event Builder	4-Oct-04	2-Jun-04	Yes
1.3.4.5.4.4	Arrival of the Event Builder hardware	15-Oct-04	15-Oct-04	Yes
1.3.11.8.5.5	Begin Purchase of Pulsar Board components	20-Oct-04	4-Nov-04	Yes
1.3.11.5.3.8	Begin Production TDC Mezzanine Card	28-Oct-04	3-Nov-04	Yes
1.3.6.2.6.4	Begin Amp Chip Production	10-Jan-05	22-Nov-04	Yes
1.3.6.2.1.1.5	Begin AMS Mezzanine Card Production	14-Jan-05	11-Nov-04	Yes
1.3.1.17.4	TDC Readout System Complete	21-Jan-05	10-Dec-04	Yes
1.3.11.6.3.6	Receipt of TDC to Finder cables complete	18-Mar-05	11-Aug-05	Yes
1.3.5.3.7	Arrival of 15 PCs from the vendor	23-Mar-05	18-Mar-05	Yes
1.3.2.9	Pulsar Level 2 subproject ready for installation	1-Apr-05	11-Mar-05	Yes
1.3.11.8.8	Begin Joint Testing with Finder Board	4-Apr-05	6-Sept-05	
1.3.11.7.5.8	Begin Production of SLAM Boards	18-Apr-05	8-Jun-05	Yes
1.3.11.4.4.8	Begin Production TDC Fiber Transition Boards	21-Apr-05	31-May-05	Yes
1.3.11.5.3.9	Checkout of TDC Mezzanine Cards Complete	6-Jun-05	26-Jul-05	Yes
1.3.11.2.5.1	Begin Production XFT Finder Boards	8-Jun-05	31-May-05	Yes
1.3.6.1.2.5	Hit Buffer Firmware Complete for Board Test	23-Jun-05	17-Aug-05	Yes
1.3.6.1.3.5	Track Fitter Firmware Complete for Board Test	28-Jun-05	20-Apr-05	Yes
1.3.1.12.6	Installation of Modified TDC's Complete	27-July-05	28-Dec-05	
1.3.4.8	Finish Event-Builder Upgrade	28-July-05	22-July-05	Yes
1.3.10.2	Ready for Accelerator Shutdown 2005	8-Aug-05	13-Oct-05	
1.3.1.12.8	TDC Modification Complete	10-Aug-05	28-Dec-05	
1.3.5.5.5	Arrival of 70 Level3 and 15 DAQ PCs	15-Aug-05	18-Mar-05	Yes
1.3.5.6.5	Arrival of 192 L3 Farm PC's from the vendor	15-Aug-05	1-Sept-05	
1.3.6.1.1.5	AMS Firmware Complete for Board Test	19-Aug-05	14-Apr-05	Yes
1.3.6.3	SVT ready for installation	25-Aug-05	16-Nov-05	
1.3.5.8	Finish Purchase of Computers for L3 DAQ system	6-Sept-05	26-Sept-05	
1.3.11.4.4.9	Checkout of TDC Transition Boards Complete	16-Sept-05	13-Oct-05	
1.3.11.7.5.9	Checkout of SLAM Boards Complete	28-Sept-05	23-Nov-05	
1.3.11.2.5.10	Finder Board Checkout Complete	29-Sept-05	2-Dec-05	
1.3.11.10	XFT Ready for Installation at CDF	29-Sep-05	2-Dec-05	
1.3.8	Finish Run 2b Trigger DAQ project	30-Sep-05	28-Dec-05	
1.3.9	DAQ and Trigger Upgrades Ready for Installation	17-Jan-06	28-Dec-05	

Run IIb Data Acquisition & Trigger Milestones (Level 1 and 2)

Name	Forecast	Baseline	Variance	2004				2005				2006	
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Begin production of Level2 Pulsar system	11/12/03	11/12/03	0 wks	◆									
First Prototype TDC available for testing	2/16/04	11/19/03	11.35 wks	◆	★								
Arrival of the prototype Event Builder hardware	3/31/04	6/3/04	-9 wks		★	◆							
Event Builder Production Readiness Review	6/2/04	10/4/04	-17 wks			★	◆						
Begin AMS Design Work	8/2/04	9/1/04	-4.4 wks			★	◆						
Begin Track Fitter Design	8/2/04	9/1/04	-4.4 wks			★	◆						
Pulsar Hardware Ready for Installation	8/20/04	8/31/04	-1.4 wks			★	◆						
Arrival of the Event Builder hardware	10/15/04	10/15/04	0 wks				◆						
Begin Production TDC Mezzanine Card	11/3/04	10/28/04	0.8 wks				◆						
Begin Purchase of Pulsar Board components	11/4/04	10/20/04	2 wks				◆						
Begin AMS Mezzanine Card Production	11/11/04	1/14/05	-8.2 wks				★	◆					
Begin Ampchip Production	11/22/04	1/10/05	-5.8 wks				★	◆					
TDC Readout System Complete	12/10/04	6/6/05	-23.8 wks				★		◆				
Pulsar Level 2 subproject ready for installation	3/11/05	4/1/05	-3 wks					★	◆				
Receipt of TDC to Finder cables Complete	8/11/05	3/18/05	20.4 wks					◆			★		
Arrival of 15 PCs from the vendor	3/18/05	3/23/05	-0.6 wks					◆					
Begin Joint Testing with Finder Board	9/6/05	4/4/05	21.4 wks					◆			◇		
AMS Firmware Complete for Board Test	4/14/05	8/19/05	-18 wks					★		◆			
Begin Production TDC Fiber Transition Boards	5/31/05	4/21/05	5.2 wks					◆	★				
Begin Production of SLAM Boards	6/8/05	4/18/05	7 wks					◆	★				
Track Fitter Firmware Complete for Board Test	4/20/05	6/28/05	-9.8 wks					★	◆				
Begin Production XFT Finder Boards	5/31/05	6/8/05	-1.4 wks						◆				
Checkout of TDC Mezzanine Cards Complete	7/26/05	6/6/05	7 wks					◆	★				
Hit Buffer Firmware Complete for Board Test	8/17/05	6/23/05	7.4 wks					◆	★				
Installation of Modified TDC's in the COT Complete	12/28/05	7/27/05	20.9 wks					◆				◇	
Finish Event-Builder Upgrade	7/22/05	7/28/05	-0.8 wks					◆					
Ready for Accelerator Shutdown 2005	10/13/05	8/8/05	9.5 wks					◆				◇	
TDC Modification Complete	12/28/05	8/10/05	18.9 wks					◆					◇
Arrival of 70 Level3 and 15 DAQ PCs from the vendor	3/18/05	8/15/05	-21 wks					★					
Arrival of 192 L3 farm PCs from the vendor	8/29/05	8/15/05	2 wks					◆					
SVT ready for installation	11/16/05	8/25/05	11.6 wks					◆					◇
Finish Purchase of Computers for Level3/DAQ	9/26/05	9/6/05	2.8 wks					◆					◇
Checkout of TDC Transition Boards Complete	10/13/05	9/16/05	3.7 wks					◆					◇
Checkout of SLAM Boards Complete	11/23/05	9/28/05	8 wks					◆					◇
Finder Board Checkout Complete	12/2/05	9/29/05	8.8 wks					◆					◇
XFT Ready for Installation at CDF	12/2/05	9/29/05	8.8 wks					◆					◇
Finish Run 2b Trigger DAQ project	12/28/05	9/30/05	11.9 wks					◆					◇
DAQ and Trigger Upgrades Ready to Install	12/28/05	1/17/06	-2.1 wks					◆					◆

Project: CDF RunIIb DAQ
 Status Date: 8/31/05
 Print Date: 9/8/05

Completed Milestone ★
 Current Forecast ◇

Baseline Milestone ◆

IV. PROCUREMENT – Pat Lukens

The option to purchase 160 Level 3 Farm computer nodes and associated racks was initiated in late August with anticipated delivery by late Nov 2005. This requisition cost \$286,705 (\$1791.91/node).

V. PROJECT HIGHLIGHTS

1.3 – Data Acquisition and Trigger

1.3.1 TDC (Time to Digital Converter) – Eric James

The installation of modified boards resumed in August. At the end of August modified boards had been installed in 12 out of 20 COT crates on the detector. TDC modification continued at a rate of about 10 boards per week. A total of 20 boards were modified in August and 10 more unmodified boards were delivered to the techs performing the board modifications. In August, our new procedure for testing modified boards was put into place. Functioning boards removed from the detector for modification are now returned to the University of Michigan for further testing and repair only if the boards fail some portion of the testing done at CDF. After one month, we have not observed an increase in the failure rate for boards on the detector stemming from this change. There are still problems with the test equipment at Michigan and a significant number of modified boards (roughly thirty) are still waiting at Michigan to be repaired. We are hopeful that Michigan will be able to get their test equipment operational again in the near future. In the meantime, a lack of available spares will force us to continue with board replacements on the detector at a rate of roughly ten boards per access opportunity.

Month	Board Modification		Detector Installation	
	Complete	Remaining	Complete	Remaining
January	39 (13%)	261	0	204
February	61 (20%)	239	21 (10%)	183
March	98 (33%)	202	42 (21%)	162
April	116 (39%)	184	69 (34%)	135
May	126 (42%)	174	69 (34%)	135
June	150 (50%)	150	99 (48%)	105
July	156 (52%)	144	99 (49%)	105
August	176 (59%)	124	132 (65%)	72

1.3.11 XFT (eXtremely Fast Tracker) II – Richard Hughes, Brian Winer, Kevin Pitts

Stereo Linker Association Module (SLAM) Boards: During the month of August progress was made on the development of the SLAM firmware. We have started testing the firmware in the teststand at OSU. We developed code for generating and running test vectors through the SLAM board. In these tests, the SLAM board input is driven by a LINKER board and a SlamDriver board. The output of the SLAM is captured by a LinkerTesterBoard. We have run test vectors at speed and successfully found 3-D stereo confirmation bits for axial tracks. Also in August, the next version of the SLAM board was fabricated and delivered. This version has a large SLAM chip (EP1S60). This board appears to operate very well. All the current tests are with this board. We obtained all the production parts for the SLAM system and fabricated the production boards. Assembly of the production boards is expected to take place in September.

XTC: With more than half of the detector instrumented with XTC boards, analysis of colliding beam data has been ongoing. The boards are performing as expected with timing resolution well below the 3ns specification. We have used colliding beam data to optimize the timing settings and also improved the robustness of the XTC firmware.

TDC Transition Module: Fabrication of the 150 production TDC Transition Modules was completed in August, and the boards were in assembly at the end of the month. Work continues on capturing data via the XTC->TDCTM->Fiber Optic->Finder path. We have additionally captured data using a CDF Pulsar board as the receiver in place of the Finder. The data path is robust and the bit error rate has been measured to be $<10^{-14}$. We are fully prepared for TDCTM checkout upon delivery of assembled boards.

Cabling: The remaining TDC transition to Finder fibers were delivered and tested in August. A requisition was placed at the end of August for the remaining interconnecting fibers (e.g. Finder to SLAM and Finder to L2 Pulsar).

Stereo Finder: Continued testing of the first production Finder boards uncovered no significant problems. All boards worked on powerup with only one minor assembly problem found. Firmware development continued in parallel with the board testing with most of the firmware for the final version of the board complete at the end of the month. A couple of minor design issues were uncovered during firmware development but they don't prevent the boards from working. We decided to make a small number of additions to the PC design before final fabrication (addition of a discrete PLL and two pull-up resistors). Schematics for these changes were complete at the end of the month. Release of the remaining production is expected in September.

1.3.4 Event Builder – Bruce Knuteson

As of August 22, the new Event Builder became the default in the CDF DAQ. Zero errors have been seen in the stores taken so far, corresponding to a per-event error rate of less than 10^{-8} . Rates up to 500 Hz have been achieved and handbrakes are being systematically removed as we increase the rate to the design limit of 1 kHz. New shift crew controls are in place and are currently being refined. Additional code documentation is being written. Maintenance of the new system has moved to new members of the MIT CDF group.

1.3.5 Level 3 computers upgrade – Doug Benjamin

Bids for 16 new Level 3 converter nodes, 8 output nodes, 4 spares, and 96 processing nodes have been received from KOI, ASA, and Dell. All three proposals meet technical specification. The award is being made to ASA as lowest bidder. The ASA quote allows us to buy 3 new racks of processing nodes (at 32 nodes per rack), a full rack more than originally estimated. The req for the remaining racks will go out in September.

An MIT postdoc is making progress on the port of the Level 3 code infrastructure to Scientific Linux, the intended Level 3 operating system coming out of the Fall shutdown.

1.3.6 SVT (Silicon Vertex Tracker) – Alberto Annovi

The first half of the SVT upgrade installation will be complete with the activation of 128k patterns per wedge. That should happen in the very near future. Congratulations are in order for every body for their hard work!

Software: All the software for AMSRW, AM++ and TF++ installation and monitoring is ready and working. We started working on improving the monitoring and test software for easier and more efficient maintenance.

AM++ and AMS/RW: 1 AM++ and 1 AMSRW for each wedge are running fine since the end of July. The PCB production for the second AM++ per wedge is in progress.

Hit Buffer: The main focus of the work is making the "write" mode (read hits and save to memory) work at full speed. Initial versions of firmware written several months ago are found to be too slow and need to be re-written. A prototype version of the write mode is now written so that it should process one hit per clock cycle at 40 MHz. This would make the HB input stage faster than the upstream board (Merger) can deliver data. The prototype is currently undergoing de-bugging and testing.

Track Fitter: During the month of August we solved lots of small problems with the TF++. We found that the board is more stable when reading the external FIFO at 40 MHz, and fixed firmware issues related to the init signal and keeping the fitter chips synchronized. We successfully took an EOS test with all 12 TF++ installed, and are in the process of validating the first large runs with all new TF++. The ever-elusive documentation is making its way to completion and should be ready within a week.

VI. FINANCIAL STATUS (as of 31 Aug 2005)

The baseline cost of the Project is \$8,196K, consisting of Run IIB Project costs (\$6,855K) plus the closeout costs of the silicon detector upgrade (\$1,341K), which will no longer be constructed.

Current Financial Tracking Report - The table below contains current values for selected financial tracking quantities that do not appear in the standard Obligations or Cost Performance Reports. For the Silicon Detector portion of the project, we assume a BAC of \$1,341K and obtain the ACWP from the Obligations report. Remaining portions of the project have their costs listed in the Cost Performance Report.

	ACWP		BCWP		BAC		Cont.	EAC	ETC	Complete
	Silicon	Non-Sil	Silicon	Non-Sil	Silicon	Non-Sil				
CY 2004										
October	1342	1957	1342	2125	1673	5254	3448	6759	6908	50%
November	1357	2081	1357	2366	1673	5254	3448	6642	6652	54%
December	1341	2199	1341	2673	1673	5254	3448	6453	6361	58%
CY 2005										
January	1341	2277	1341	2909	1673	5254	3448	6295	6125	61%
February	1341	2396	1341	3095	1341	5531	3503	6173	5939	65%
March	1341	2866	1341	3361	1341	5531	3503	6377	5673	68%
April	1341	3028	1341	3378	1341	5945	3089	6936	5656	65%
May	1341	3274	1341	3850	1341	5945	3089	6710	5184	71%
June	1341	3715	1341	4378	1341	5945	910	6623	2477	78%
July	1341	4143	1341	4677	1341	6075	780	6882	2178	81%
August	1341	4291	1341	4885	1341	6075	780	6822	1970	84%

CDF RunIIb Obligations Report - This report provides a Level 2 summary of outstanding Purchase Orders (PO) where money has been committed but for which the Project has not been invoiced. This does not include requisitions in the system where a Fermilab PO number has not yet been assigned. A brief description of the columns included in this report is given below:

- Current Month Total Cost – The cost charged to the project for the reporting month.
- Current Month Obligation – This is the total of the obligations made against the project for the reporting month.
- Year to Date Total Cost – This is the total cost charged to the project in this fiscal year.
- Year to Date Obligations with Indirect – This is the total of the obligations made against the project for this fiscal year.
- Current Purchase Orders Open Commitment – This is the total of the open commitments against the project. It includes open commitments from the current and all prior years.
- Prior Year Total Cost - This is the total cost charged to the project in all prior fiscal years.

The total project cost is simply the sum of the Year-to-Date costs and the Prior Year costs. The total committed and spent is the Total Project Cost plus the Open Commitment value.

**CDF Project
Obligations Report
Through 31 August 2005**

CDF RIIb EQU - August FY05 IN \$K							
Task Number	Expenditure Category	Current Month Total Cost	Current Month Obligation	YTD Total Cost	YTD Obligations w/Indirect	Current PO Open Comm	Prior Yr Total Cost
Silicon	M&S	0.0	0.0	(0.3)	(103.7)	0.0	539.0
	SWF	0.0	0.0	(1.1)	(1.1)	0.0	571.1
	OH	0.0	0.0	(2.7)	(2.7)	0.0	230.9
	Total 1.1	0.0	0.0	(4.1)	(107.5)	0.0	1,341.0
Calorimeter	M&S	0.0	0.0	63.2	21.2	1.6	211.8
	SWF	0.0	0.0	0.0	0.0	0.0	139.1
	OH	0.0	0.0	1.2	1.2	0.0	51.5
	Total 1.2	0.0	0.0	64.3	22.4	1.6	402.3
Trigger/DAQ	M&S	85.2	399.3	1,568.8	1,969.5	458.3	708.2
	SWF	30.5	30.5	394.6	394.6	0.0	220.7
	OH	13.1	0.0	234.3	234.3	0.0	129.2
	Total 1.3	128.8	429.9	2,197.7	2,598.4	458.3	1,058.1
Administration	M&S	3.7	3.7	11.6	11.6	0.0	29.1
	SWF	11.5	11.5	133.6	133.6	0.0	268.2
	OH	4.1	0.0	42.1	42.1	0.0	84.4
	Total 1.4	19.3	15.2	187.2	187.2	0.0	381.7
Total Project	M&S	88.9	403.1	1,643.2	1,898.6	459.9	1,488.2
	SWF	42.0	42.0	527.2	527.2	0.0	1,199.0
	OH	17.2	0.0	274.8	274.8	0.0	495.9
Grand Total		148.1	445.1	2,445.2	2,700.5	459.9	3,183.1

Total Project Cost (Inception To Date): 5,628.3

CDF Project Cost Performance Report (CPR) – This report is generated from COBRA and provides a summary of the WBS 1.2-1.4 costs of the Project down to Level 3 of the Work Breakdown Structure. Silicon detector subproject closeout costs are not tracked here. Input data originates with the status (% Complete) of the Project schedules as reported by the Level 2 managers and actual costs extracted from the Fermilab accounting system. Where possible, costs are accrued for items that have been delivered, but not yet invoiced. This is only possible for a small fraction of our cost. Financial summaries are shown for this reporting period (columns 2-6) as well as the project to date (columns 7-11). Column 12 contains our baseline BAC, and will only be changed after the formal implementation of the Change Control process. Column 13 is the projected BAC, based on the current month's schedule. A number of specialized financial terms and abbreviations used in the CPR are defined here for convenience:

ACWP – Actual Cost of Work Performed. This is the actual cost of tasks that have been completed.

BAC – Budget at Completion. The BAC is the estimated total cost of the project when completed. It is equivalent to the BCWS at completion. The baseline value of the BCWS is contained in column 12 of the Cost Performance Report.

BCWP – Budgeted Cost of Work Performed. This is the scheduled cost profile of tasks that have been completed.

BCWS – Budgeted Cost of Work Scheduled. This is the sum of the budgets for all planned work to be accomplished within a given time period.

CV – Cost Variance. $CV = BCWP - ACWP$

EAC – Estimate At Completion. This is the ACWP to date, plus the BCWS (current scheduled estimate) of remaining tasks. $EAC = (BAC (current) - BCWP) + ACWP$

ETC – Estimate to Completion. $ETC = EAC - ACWP + Contingency$

Percent Complete - %Com = $\frac{BCWP}{BAC}$

SV – Schedule Variance. $SV = BCWP - BCWS$

CDF Project
Cost Performance Report
as of 31 August 2005

Cost Performance Report - Work Breakdown Structure															
Contractor: Location:						Contract Type/No:			Project Name/No: CDF RIIB		Report Period: 7/31/2005 8/31/2005				
Funding Type-CA WBS[2] WBS[3] Item		Current Period				Cumulative to Date					At Completion				
		Budgeted Cost		Actual Cost Work Performed	Variance		Budgeted Cost		Actual Cost Work Performed	Variance		Baseline BAC	Latest Revised BAC	BAC Delta	
		Work Scheduled	Work Performed		Schedule	Cost	Work Scheduled	Work Performed		Schedule	Cost				
EQU Equipment															
1.2 Calorimeter Upgrades															
1.2.1 Central Preshower and Crack Detectors		0	0	0	0	0	444,504	444,504	442,924	0	1,581	444,504	444,504	0	
1.2.2 Electromagnetic timing		0	0	0	0	0	23,403	23,403	23,403	0	1	23,403	23,403	0	
WBS[2]Totals:		0	0	0	0	0	467,908	467,908	466,327	0	1,581	467,908	467,908	0	
1.3 Run 2b DAQ and Trigger Project															
1.3.1 Run 2b TDC Project		23,860	70,625	5,570	46,765	65,055	648,854	590,701	475,100	-58,153	115,601	655,792	700,354	44,562	
1.3.2 Run 2b Level 2 Project		12,863	13,185	22,027	321	-8,842	465,621	465,912	441,936	292	23,976	473,959	473,959	0	
1.3.4 Event-Builder Upgrade		0	7,520	-481	7,520	8,001	435,363	410,296	406,968	-25,067	3,328	435,363	435,363	0	
1.3.5 Computer for Level3 PC Farm / DAQ		113,487	10,438	0	-103,049	10,438	1,112,390	490,850	337,319	-621,540	153,532	1,185,000	1,185,000	0	
1.3.6 SVT upgrade		14,522	11,934	35,257	-2,589	-23,324	349,779	314,672	290,220	-35,106	24,452	362,407	362,407	0	
1.3.11 Revised XFTII Project		46,998	47,030	66,433	31	-19,403	1,693,613	1,534,049	1,304,587	-159,564	229,462	1,750,000	1,749,485	-515	
WBS[2]Totals:		211,731	160,731	128,806	-51,000	31,925	4,705,619	3,806,481	3,256,130	-899,138	550,350	4,862,520	4,906,567	44,047	
1.4 Administration															
1.4.3 Construction Phase		17,640	17,640	19,326	0	-1,686	580,703	580,703	568,970	0	11,733	744,322	744,322	0	
WBS[2]Totals:		17,640	17,640	19,326	0	-1,686	580,703	580,703	568,970	0	11,733	744,322	744,322	0	
Funding Type-CATotals:		229,372	178,371	148,132	-51,000	30,239	5,754,229	4,855,091	4,291,427	-899,138	563,664	6,074,749	6,118,796	44,047	
Sub Total		229,372	178,371	148,132	-51,000	30,239	5,754,229	4,855,091	4,291,427	-899,138	563,664	6,074,749	6,118,796	44,047	
Management Resrv.													780,251	736,204	-44,047
Total		229,372	178,371	148,132	-51,000	30,239	5,754,229	4,855,091	4,291,427	-899,138	563,664	6,855,000	6,855,000	0	

VII. VARIANCE ANALYSIS – D. Benjamin

Subproject	Schedule Variance	Cost Variance
Run 2b TDC	A revised testing and installation plan has been implemented. The current schedule does not reflect the new plan. A change control is planned to revise the schedule.	(See Schedule Variance analysis)
Run 2b Level 2	None	None
Run 2b XFTII	None	Receipt of the production components for the Finder boards occurred very rapidly.
Event Builder	Ahead of schedule	Ahead of schedule
Computers for Level 3 and DAQ	A purchase order has been placed for 96 Level 3 Farm computer nodes with an option for 160 additional nodes. The option for an addition 160 nodes was exercised. A change control is planned to revise to the schedule to reflect the actual purchases.	Cost will not be incurred until the material arrives. A better model of cost accrual will be implemented.
SVT Upgrade	None	PO for work done at a collaborating institution was placed and costs accrued.

VIII. BASELINE CHANGES

A change in the cost of the project was made in with Change Request #23 in early August, 2005. The change represented a use of contingency of approximately \$45K to cover a change in the parts used for the Stereo Linker Module of the track trigger. Also, \$83K was taken from contingency to cover an increase in the cost for data acquisition computers.

IX. FUNDING PROFILES

The funding profile for the RunIIb CDF Detector Project is shown below. This profile has been updated to reflect the new total cost of the project.

	Funding Plan in Current Year \$K				
	FY02	FY03	FY04	FY05	Total
DOE MIE	\$ 3,460	\$ 3,509	\$ 1,227	\$ -	\$ 8,196
DOE R&D	\$ 1,670	\$ 480	\$ -	\$ -	\$ 2,150
Foreign Contributions	\$ 39	\$ 518	\$ 234	\$ 404	\$ 1,195
U.S. Universities	\$ 24	\$ 225	\$ 103	\$ 26	\$ 378
Total	\$ 5,193	\$ 4,732	\$ 1,564	\$ 430	\$ 11,918